The total effect of the parasite has scarcely more than 1 per cent. of the efficiency claimed for it in the publication under consideration, even though this is figured on a 40-fold increase instead of 25-fold. In every particular the assumptions upon which the above table is based are more favorable for the parasite than the experimental data presented by Mr. Hunter justify. And, moreover, the efficiency of the parasite does not increase by any such proportion as is generally assumed, the weekly averages only varying from each other by a small fraction, showing that years would have to elapse before the parasite would reach the efficiency supposed to be attained in twenty-five days or a month.

Of course, other factors enter into the problem, but the point that this calculation demonstrates is that these other factors are so much more important that, as compared with them, the work of the parasite is a negligible factor.

As corroborative evidence the author quotes Professor Marchal's account of the efficiency of the Australian ladybird against the cottony cushion scale. It may be instructive to state that during the last eighteen years this supposedly suppressed scale insect has figured as largely in the correspondence of the entomological department of the University of California as any scale existing in the state, and that on the university grounds and in the surrounding region it is now and has been all these years the most injurious scale insect present with the possible exception of the black scale.

Nearly all previous discussions of the efficiency of parasites or predaceous insects have been records of impressions instead of the presentation of experimental data. This author has accumulated a splendid lot of data, but has not used it. Like the others of us, he has been so impressed with the evidence he saw in the form of innumerable plant-louse mummies that he failed to grasp the importance of other conditions, probably largely meteorological, which might have caused the disappearance of the lice equally as soon had there been no parasites present. Aside from this one question of interpretation the work will be of great value to subsequent students of parasitism.

C. W. WOODWORTH
UNIVERSITY OF CALIFORNIA

Geology of the City of New York. By L. P. GRATACAP. Third edition. 8vo, pp. x + 232, 65 figs., 4 maps. New York, Henry Holt and Co. 1909. $2.50.

Gratacap's "Geology of the City of New York" was originally issued in 1901 as a pamphlet of 82 pages, specially designed for teachers of science, for pupils in the schools of the city and for the general reader to whom the metropolitan district furnished an attractive field of observation and study. The American Museum of Natural History conducts most commendable series of lectures for the teachers of the city and the manual found in them a constituency greatly needing just such a work. With the second edition the text was expanded to 119 pages, and now with the third the size of page is reduced from royal octavo to the more convenient octavo size and is expanded to embrace the latest results of study in the district. Practically a new book has been prepared.

The work opens with a general introduction intended to place the reader in command of the facts of stratigraphical classification, and, since the area is a metamorphic one, with the general principles and processes of this branch of geology. Manhattan Island is then described in detail; its topography, its rocks, its waterways, its minerals, etc. The boroughs of Brooklyn and Queens are next treated in a similar but much less detailed manner. Being covered with glacial drift throughout almost all of their area they furnish fewer rock exposures. The borough of the Bronx, although nearly as large as Manhattan and of similar formations, receives but a brief mention of four pages, and the borough of Richmond or Staten Island about four times as much. The evidences of glaciation in and about Greater New York are then taken up in the concluding pages.

The work contains a great deal of valuable record that will prove serviceable to engineers and contractors as well as to teachers and those with a popular interest in science. There

are historical details not easily attainable elsewhere. There is a valuable annotated list of minerals and an excellent bibliography. There is some need for the author to take greater care to attain a form of expression which may be grasped by those not necessarily widely read in the science. Unusual words such as femic, salic, crenitic and the like might best be omitted. In the stratigraphical table, page 5, if Carboniferous is replaced by Carbonic, why not use also Cambric, Siluric, Devonic and Cretacic. In the treatment of the stratigraphy of Manhattan Island, it is far simpler and clearer to take up the Fordham gneiss, the Inwood limestone and the Manhattan schist, than to treat merely of gneiss, limestone and schist, with minor varieties. If, when a fourth edition is called for, the author will place himself in the attitude of a reader not of profound attainments in geology and, thus grasping his or her point of view, will put the facts of the local strata in simple and clear language, and will add an index, a work already serviceable and of value will be made still more so.

J. F. Kemp

An Elementary Treatment of the Theory of Spinning Tops and Gyroscopic Motion. By Harold Crabtree. Pp. xii + 140. New York, Longmans, Green & Co. 1909.

This is a very satisfactory book for one who wishes to gain a clear understanding of gyroscopic action. It contains a good discussion of Schlick's method of steadying vessels at sea and of Brennan's gyroscopic mechanism for balancing a monorail car.

The introductory chapter describes a number of curious and interesting forms of tops and gyroscopes. Chapter I. discusses rotation about a fixed axis, Chapter II. discusses precession and Chapter III. is a discussion of the phenomena described in the introductory chapter.

The starting of precession and gyroscope oscillations are discussed in Chapter IV., and the remainder of the book, Chapters V., VI., VII., VIII. and IX., discuss the more elaborate aspects of the theory of gyroscopic action.

The curious behavior of the stone implement known as the celt which is described on pages 7 and 54 may be observed with an ordinary pocket-knife with a rounded back. When such a knife is twirled on a smooth table the reaction of the table due to its vibratory motion causes its direction of spin to be reversed and if the knife is set rocking about a horizontal axis the reaction of the table due to the vibratory motion produces a slight spin about a vertical axis.

Altogether the book is a welcome and valuable addition to the literature of rotatory motion.

W. S. Franklin

SPECIAL ARTICLES

A SIMPLE CLOUD APPARATUS

The celebrated experiment on the production of clouds by C. T. R. Wilson forms an instructive lecture table demonstration. This need not necessarily be a difficult experiment. It is common observation that clouds of greater or less density are often seen upon the first few strokes of the pump when evacuating a vessel containing some moisture. The apparatus as Wilson constructed it was of necessity rather elaborate. That it may be of exceedingly simple and inexpensive construction and yet capable of giving quantitative results of a fair degree of accuracy is the object of this paper.

The apparatus consists of a glass bulb having two openings. To one, the larger, is attached a stiff rubber bulb, to the other a nipple for the introduction of the gases, etc., to be investigated. For qualitative results the glass vessel is blown in the form of a hooded bulb *B*, as shown in Fig. 1. This bulb should have a volume of about 75 c.c., while the hand bulb *HB* may be the stiff bulb that comes with an hydrometer syringe for testing electrolytes. The volume of this bulb should be about 250 c.c. The nipple *n* is closed by a rubber tube and a screw pinch-cock at *p*. It is well to insert a short glass tube extension beyond *p*. To operate, draw into the bulb *B* two or three cubic centimeters of water. This will be caught by the annulus or trough in *B*, thus keeping the gas in the bulb in contact with